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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,566	02/11/2004	James J. Estrada	07844-620001	6004

21876 7590 01/25/2008
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EXAMINER	
LO, SUZANNE	

ART UNIT	PAPER NUMBER
2128	

MAIL DATE	DELIVERY MODE
01/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/777,566	Applicant(s) ESTRADA, JAMES J.	
	Examiner Suzanne Lo	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-8, 10-25, 27-34 have been presented. The prosecution of the instant application is now before Suzanne Lo.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 17, and 32, it is unclear how a modeling error is obtained from a plurality of differences between a second power law function and the transfer function. The difference between two functions is another function. All individual differences with respect to one axis are expressed as a singular difference in the form of a function. Thus the modeling error of claims 1, 17, and 32 is interpreted as to be obtained from a function difference between a second power law function and the transfer function.

All dependent claims are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-5, 8-11, 15-22, 25-28, and 32-34** rejected under 35 U.S.C. 103(a) as being unpatentable over **Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119)**.

Consider claim 1 and 18, Winter et al. discloses a computer-implemented method for adjusting the color information of an image (abstract) by modeling a non-linear transfer function with a power law function (FIG. 4-7, col. 3 lines 14-20), and a computer program product, implemented on a machine readable *storage device*, for adjusting the color information of an image by modeling a non-linear transfer function with a power law function, the computer program product comprising instructions operable to cause a programmable processor to (col. 2 lines 60-68, CPU 16, software procedures): receiving a transfer function, wherein the transfer function specifies a set of output values corresponding to a set of input values (**curve 32, 60, 62, 64 on FIG. 4-7**); and iteratively, until a termination flag is set (**col. 2 lines 25-30, additional comparison is made (comparison is iterative); col. 2 lines 22-26, if the comparison are within threshold, the averaged value is employed to control color (flag))**: receiving a first power law function and a second power law function (**col. 4 lines 24-27, the gamma values associated with power law functions are determined**); calculating a modeling error from the second power law function and the transfer function (**col. 4 lines 42-44, transfer function gamma values are compared to determine if they are within a threshold values**); and setting the termination flag when the modeling error is less than a predetermined value (**col. 2 lines 22-26, if the comparison are within threshold, the averaged value is employed to control color**); and using the second power law function to calculate a gamma value that is used to adjust the color information of the image (**col. 2 lines 22-26, the averaged value is employed to control color**).

However, Winter et al. fails to disclose generating an auxiliary function from the transfer function and local differences between the transfer function and the first power law function; fitting a second power law function to the auxiliary function. Takemoto discloses determining difference between curves (**col. 8 lines 19-20**) and using "curving fitting" method (**col. 8 lines 15-16**) wherein an auxiliary function is generated from the transfer function and local differences between the transfer function and the first power law function (**column 3, lines 21-51**), fitting a second power law function to the auxiliary function

(column 3, lines 67-column 4, line 7 and column 4, lines 42-46), and calculating a modeling error from the second power law function and the transfer function **(column 4, lines 53-62)**, *wherein the modeling error is obtained from a plurality of differences between the second power law function and the transfer function* **(column 4, lines 53-62).** They are analogous art because they both are related to image processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize method of determining the difference between the curves **(auxiliary function)** and using "curve fitting" of Takemoto for the color adjusting method of Winter et al. in order to correct tone conversion curve (**Takemoto, col. 8 lines 5-6**).

Consider claim 2 and claim 19, Winter et al. discloses the method of claim 3 and the computer program product of claim 20, wherein: receiving the first power law function in a given iteration comprises receiving the second power law function that was generated in the preceding iteration **(col. 4 lines 24-27, lines 35-37)**.

Consider claim 3 and claim 20, Winter et al. discloses the method of claim 1 and the computer program product of claim 18, wherein: receiving the first power law function in the first iteration comprises receiving a power law function generated by fitting the transfer function **(col. 3 lines 14-20, col. 4 lines 24-27)**.

Consider claim 4 and claim 21, Winter et al. discloses the method of claim 1 and the computer program product of claim 18, further comprising: counting the number of iterations; and setting the termination flag when the number of iterations exceeds a maximum number of iterations **(col. 6 lines 12-14, repeated three times).**

Consider claim 5 and claim 22, Winter et al. discloses the method of claim 1 and the computer program product of claim 18, wherein: the transfer function is a transfer function for gamma correction **(col. 3, lines 14-20, gamma value which defines transfer function)**, and the first and second power law functions are power law functions having a form of $c\,x^{\beta}$, wherein x is the input variable of the power law

functions, and c and β are real numbers (**It is well-known in the art that a power law functions having a form of c x^{β}, wherein x is the input variable of the power law functions, and c and β are real numbers).**

Consider claim 8 and claim 25, Takemoto discloses the method of claim 1 and the computer program product of claim 18, further comprising: using a modifying parameter **(col. 8 lines 18-20, coefficient)** to weight the local differences between the transfer function and the first power law function, and using the weighted local differences to generate the auxiliary function **(col. 8 lines 18-20, difference)**.

Consider claim 10 and claim 27, Winter et al. and Takemoto disclose the method of claim *8* and the computer program product of claim *25, further comprising*: Generating a plurality of auxiliary functions from the transfer function, the first power law function and a corresponding plurality of modifying parameters, wherein each auxiliary function is generated by weighting the local difference between the transfer function and the first power law function using a corresponding one of the plurality of modifying parameters **(Takemoto, col. 8 lines 19-20, difference (auxiliary function) between curves (transfer function and power law functions), coefficient (weight))**; Fitting each of the plurality of auxiliary functions to generate a respective plurality of second power law functions **(Winter et al., col. 4 lines 24-27, col. 4 lines 36-37, curves 60 and 62 with difference gamma values determined using curve fitting)**, where each of the plurality of second power law functions corresponds to one of the plurality of modifying parameters **(Takemoto, col. 8 lines 19-20)**; Calculating a plurality of modeling errors between the transfer function and each of the plurality of second power law functions **(Winter et al., col. 4 lines 42-44, transfer function gamma values are compared to determine if they are within a threshold values)**, wherein each of the modeling errors corresponds to one of the plurality of modifying parameters; and Executing a minimization procedure **(Takemoto, col. 7 lines 59- col. 8 lines 22, tone correction)** to determine the value of the modifying parameter that minimizes the modeling error and

using the value of the modifying parameters that minimizes the modeling error to weight the local differences between the transfer function and the first power law function **(Winter et al., col. 3, lines 14-20, gamma value which defines transfer function; Takemoto, col. 8 lines 18-20, difference).**

Consider claim 11 and claim 28, Winter et al. and Takemoto disclose the method of claim 10 and the computer program product of claim 27, wherein executing the minimization procedure **(Takemoto, col. 7 lines 59- col. 8 lines 22, tone correction)** comprises fitting a quadratic function to a distribution of modeling errors as a function of the plurality of modifying parameters **(FIG. 3A, tone correction curve, col. 8 lines 16, quadratic functions).**

Consider claim 15 and claim 32, Winter et al. discloses the method of claim 1 and the computer program product of claim 18, wherein: receiving a transfer function comprises receiving a plurality of transfer function values **(col. 3, lines 14-20, FIG. 4-7).**

Consider claim 16 and claim 33, Winter et al. discloses the method of claim 1 and the computer program product of claim 18, wherein: receiving a transfer function comprises receiving a piecewise continuous monotonically increasing transfer function **(FIG. 4-7, curves).**

Consider claims 17 and 34, Winter et al. discloses a computer-implemented method for adjusting the color information of an image **(abstract)** by modeling a non-linear transfer function with a power law function **(FIG. 4-7, col. 3 lines 14-20),** and a computer program product, implemented on a machine readable *storage device*, for adjusting the color information of an image by modeling a non-linear transfer function with a power law function, the computer program product comprising instructions operable to cause a programmable processor to **(col. 2 lines 60-68, CPU 16, software procedures):** receiving a transfer function, wherein the transfer function specifies a set of output values corresponding to a set of input values **(curve 32, 60, 62, 64 on FIG. 4-7);** fitting the transfer function with a first power law function **(col. 4 lines 24-27, the gamma values associated with power law functions are determined using curve fitting);** and a second power law function **(col. 4 lines 24-27, the gamma**

values associated with power law functions are determined) iteratively, until a termination flag is set **(col. 2 lines 25-30, additional comparison is made (comparison is iterative); col. 2 lines 22-26, if the comparison are within threshold, the averaged value is employed to control color (flag))**: calculating a modeling error from the second power law function and the transfer function **(col. 4 lines 42-44, transfer function gamma values are compared to determine if they are within a threshold values)**; identifying the first power law function with the second power law function **(col. 4 lines 24-27, col. 4 lines 36-37, curves 60 and 62 with difference gamma values)**; and setting the termination flag when the modeling error is less than a predetermined value **(col. 2 lines 22-26, if the comparison are within threshold, the averaged value is employed to control color)**; and using the second power law function to calculate a gamma value that is used to adjust the color information of the image **(col. 2 lines 22-26, the averaged value is employed to control color)**.

However, Winter et al. fails to disclose reflecting the first power law function about the transfer function to generate an auxiliary function; fitting the auxiliary function with a second power law function. Takemoto discloses determining difference between curves **(col. 8 lines 19-20)** and using "curve fitting" method **(col. 8 lines 15-16)** wherein an auxiliary function is generated from the transfer function and local differences between the transfer function and the first power law function **(column 3, lines 21-51)**, fitting a second power law function to the auxiliary function **(column 3, lines 67-column 4, line 7 and column 4, lines 42-46)**, and calculating a modeling error from the second power law function and the transfer function **(column 4, lines 53-62)**, *wherein the modeling error is obtained from a plurality of differences between the second power law function and the transfer function* **(column 4, lines 53-62).** They are analogous art because they both are related to image processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize method of determining the difference between the curves **(auxiliary function)** and using "curve fitting" of Takemoto for the

color adjusting method of Winter et al. in order to correct tone conversion curve **(Takemoto, col. 8 lines 5-6)**.

4. **Claims 6 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119) as applied to claims 5 and 22 above, **and further in view of Haider et al. (U.S. Pub 2004/0267854).**

Consider claims 6 and 23, Winter et al. and Takemoto disclose the method of claim 5 and the computer program product of claim 22, fitting the second power law function to the auxiliary function (see rejections above). However, Winter et al. and Takemoto fails to disclose fitting a linear function to a logarithmic representation of the auxiliary function which is the process of "fitting the second power law function to the auxiliary function" in the logarithmic domain. Haider et al. disclose a converter that performs a logarithmic conversion for input signal (a function) ([0077]-[0078]). They are analogous art because they both are related to image processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the logarithmic conversion of Haider et al. for the gamma correction apparatus of Winter et al. and Takemoto because Haider et al. teaches logarithmic conversion could simplify mathematical calculations ([0002]).

5. **Claims 7 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119) and Haider et al. (U.S. Pub 2004/0267854) as applied to claims 6 and 23 above, **and further in view of Holub (U.S. Patent No.6,157,735).**

Consider claims 7 and 24, Winter et al., Takemoto, and Haider et al. disclose the method of claim 6 and computer software product of claim 23, fitting a linear function to a logarithmic representation of the auxiliary (see rejections above). However, Winter et al., Takemoto, and Haider et al. fail to discloses minimizing a least square error. Holub discloses least square error minimization **(col. 23 lines 44-45).**

They are analogous art because they both are related to image processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the least square error minimization of Holub for the gamma correction apparatus of Winter et al., Takemoto, and Haider et al. because Holub teaches a way to reduce error **(col. 23 lines 44-45)**.

6. **Claims 12 and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119) as applied to claims 10 and 27 above, **and further in view of Shen et al. (U.S. Pub 2005/0088534).**

Consider claims 12 and 29, Winter et al. and Takemoto disclose the method of claim 10, and computer program product of claim 27, executing the minimization procedure (see rejection above). However, Winter et al. and Takemoto fails to disclose a golden search algorithm. Shen et al. disclose a conventional golden search **([0035])**. They are analogous art because they both are related to image processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the golden search method of Shen et al. for the gamma correction apparatus of Winter et al. and Takemoto because Shen et al. teaches a golden search method to find the best parameter **(FIG. 7)**.

7. **Claims 13 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119) as applied to claims 1 and 18 above, **and further in view of Wu et al. (U.S. Patent 6,076,964).**

Consider claims 13 and 30, Winter et al. and Takemoto discloses the method of claim 1 and the computer program product of claim 18, wherein: calculating the modeling error for the second power law function comprises calculating a error between the transfer function and the second power law function **(Winter et al., col. 4 lines 42-44, transfer function gamma values are compared to determine if they are within a threshold values)**. However, Winter et al. and Takemoto fails to disclose using a total square error technique to calculate the error. Wu et al. disclose using a total square error technique to

calculate a error for a non-linear dynamic model **(abstract, col. 4 lines 52-64)**. They are analogous art because they both are related to model a non-linear function (Wu et al., see abstract, col. 4 lines 52-64). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilizes total square error technique of Wu et al. for the model of non-linear transfer functions of Winter et al. and Takemoto. because Wu et al. teaches the model parameters can be found by minimizing the total square error (col. 4 lines 62-64).

8. **Claims 14 and 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Winter et al. (U.S. Patent No. 5,381,349) in view of Takemoto (U.S. Patent No. 7,076,119) as applied to claims 1 and 18 above, **and further in view of Lum et al. (U.S. Patent 5,398,076).**

Consider claims 14 and 31, Winter et al. and Takemoto discloses the method of claim 1 and the computer program product of claim 18, wherein: calculating the modeling error for the second power law function comprises calculating a error between the transfer function and the second power law function **(Winter et al., col. 4 lines 42-44, transfer function gamma values are compared to determine if they are within a threshold values)**. However, Winter et al. and Takemoto fails to disclose using a maximum absolute difference technique to calculate the error. Lum et al. disclose using a maximum absolute error technique to calculate an error with and without gamma correction **(col. 5 lines 21-45)**. They are analogous art because they both are related to model a non-linear function (Lum et al., see col. 2 lines 48-68 where a gamma correction is implemented in order to correct the non-linearity of a signal which is transformed to a function). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a maximum absolute error technique of Lum et al. for the model of non-linear transfer functions of Winter et al. and Takemoto because Lum et al. teaches a maximum absolute error could be an indicator for the performance of gamma correction process **(col. 5 lines 21-45)**.

Response to Arguments

9. Applicant's arguments filed 11/07/07have been fully considered but they are not persuasive.

10. The 35 U.S.C. 101 rejections have been withdrawn due to the amended claims.

11. The 35 U.S.C. 112 rejections made in the previous office action have been withdrawn.

12. In response to applicant's arguments against the references individually (i.e. Winters does not disclose generating an auxiliary function from the transfer function and local differences between the transfer function and the first power law function and fitting a second power law function to the auxiliary function), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

13. In response to Applicant's argument that it is unclear what Takemoto discloses, a more detailed mapping has been provided above in the prior art rejection as well as an explanation of the mapping provided below. The auxiliary function is derived from the difference between the first power law and transfer function through the use of the brightness calibration and the use of the comparison color patch **(column 3, lines 21-51)**. A gamma value is determined from the comparison color patch, thus disclosing fitting a second power law to the auxiliary function in order to generate another gamma value **(column 3, lines 67-column 4, line 7 and column 4, lines 42-46)**. Then a modeling error is obtained from the second power law function and the transfer function as the differences between the two gamma values as function difference **(column 4, lines 53-62)**.

Conclusion

Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. All claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suzanne Lo whose telephone number is (571)272-5876. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2297. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAMINI SHAH
SUPERVISORY PATENT EXAMINER

Suzanne Lo
Patent Examiner

Art Unit 2128

/SL/
01/19/08